SAFETY INSTRUCTIONS

Before using the product, please read carefully the warning messages and instructions on labels and user manual of this product and other components connected to the product.

This product is designed to be connected with lead-acid battery only. Do not connect the product with other types of battery.

To reduce risk of damage and injury, please use batteries with good quality.

In the event flooded batteries are used, regular maintenance on the battery shall be performed.

The product is design for indoor installation. Please do not expose the product to direct sunlight, rainfall, or snow.

Before performing any maintenance on the product, please disconnect all power sources (AC mains, batteries, solar panel) to avoid the risk of electrical shock.

Do not attempt to disassemble or repair the product. Only authorized personal are allowed to perform repair.

While performing maintenance or cleaning (especially on the batteries where hazardous liquid might be touched), it's recommended to wear necessary personal protections (e.g. gloves and goggle).

The product and external batteries shall not be installed anywhere near smoke, spark, and flame.

In the event a generator with auto-start function is connected with the product, before performing maintenance or cleaning should disconnect it.

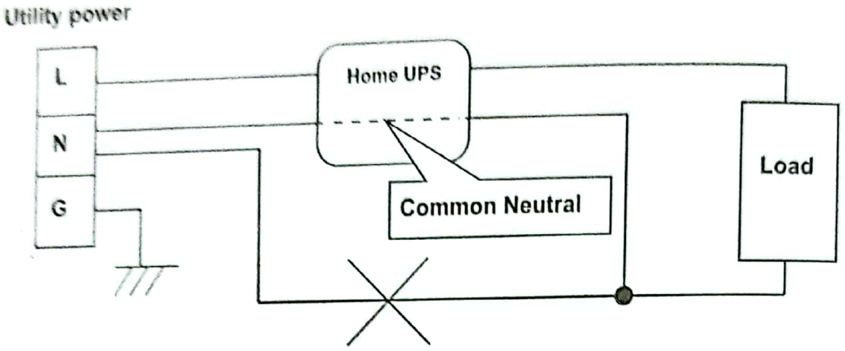
DO NOT connect neutral of the power distribution box on the wall to the output neutral of HOME UPS. Otherwise the reversed polarity will damage the HOME UPS and the connected equipment.

CAUTION! Authorized service personnel should reduce the risk of electrical shock by disconnecting AC, DC and battery power from the inverter before attempting any maintenance or cleaning or working on any circuits connected to the inverter. Turning off controls will not reduce this risk. Internal capacitors can remain charged for 5 minutes after disconnecting all sources of power.

CAUTION! Under high temperature environment, the cover of this inverter could be hot enough to cause skin burns if accidentally touched. Ensure that this inverter is away from normal traffic areas.

Symbols used in Equipment Markings

ℹ	Refer to the operating instructions
⚠	Caution,risk of danger
⚡	Caution,risk of danger shock
⚡ ◷	Caution,risk of danger shock,Energy storage timed discharge
♨	Caution,hot surface



SCOPE OF WARRANTY

The product comes with a standard 1-year warranty. This warranty includes all defects of design, components and manufacturing. The Warranty is avoid and does not cover any defects or damages caused by in any of the following circumstances:

Seal on the product is broken
The product has been misused, neglected, or abused
Improper transportation and delivery
The product has been used or stored in conditions outside its electrical or environmental specifications
The product has been used for purposed other than for which it was designed
The product has been used outside its stated specifications, operating parameters and application
Acts of third parties, atmospheric discharges, excess voltage, chemical influences, natural wear and tear and for loss and damage in transit
Improper testing, operation, maintenance, adjustment, repair, or any modification of any kind not authorized in writing by the supplier
The product has been connected to other equipment with which it is not compatible
Use and application beyond the definition in this manual
Application beyond the scope of applicable safety standards or grid codes
Acts of nature such as lighting, fire, storm, flood, vandalism and etc.
The right to repair and/or replace the defective product is at the supplier's sale discretion. The supplier is not responsible for damages beyond the scope of this warranty.

PRODUCT OVERVIEW

This is a DC-to-AC inverter, which can be used as a long run-time UPS (Uninterruptible Power Supply), an energy-saving solution or an automotive inverter (hereinafter referred to as "**inverter**"). The inverter accepts input power source from AC mains (utility), battery and PV (solar) string and switches between various operation modes automatically depending on the operational conditions.
When used as an UPS, battery or PV (solar) string acts as back-up power source to supply loads during the outage of AC mains.
When used as an energy-saving device, the PV (solar) string can be set as priority to supply the loads without consuming the power from AC mains, as long as sufficient sunlight is present.
The battery can be charged by both AC mains and PV (solar) string with intelligent charging control.

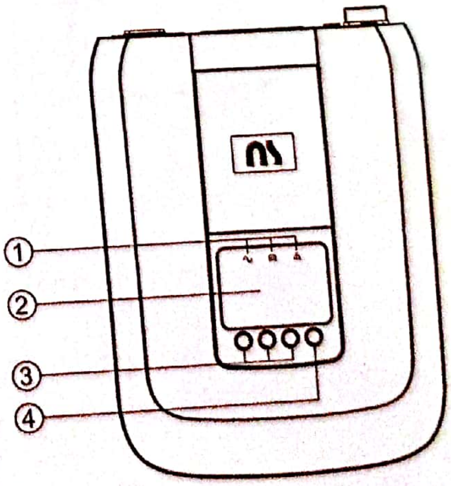
Key features:

Automatic line-to battery switchover
Selectable input voltage ranges
Rack Tower design for flexible placement
Built-in enhanced charger
High efficient DC-to-AC conversion with minimizing energy loss
Intelligent 3-stage charger control for efficient charging
Provide discharge, overcharge, over-temperature, overload and short-current protection
Auto restart upon AC recovery
0/10/15/20/25 charger current selectable for PREMIUM PLUS 1200
0/5/10/15/20 charger current selectable for PREMIUM PLUS 2000
User-friendly LCD +LED indications
Different shut down battery voltage according to different load level
Charger temperature compensation

PRODUCT OUTLOOK

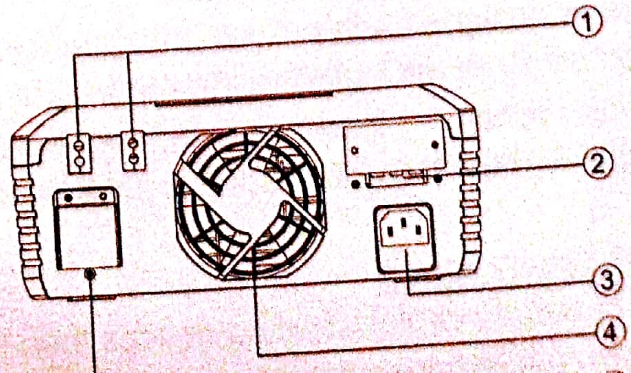
Top panel

1. LED indicators
2. LCD
3. Setting function buttons
4. Power ON/OFF switch



Rear Panel

1. DC input wires
2. AC output receptacle
3. AC inlet
4. Cooling fan
5. PV input terminals



INSTALLATION

Unpacking and Inspection

This product package include following items. Please call your supplier or dealer if any items are missing.

- 1 X Inverter
- 1 X AC cable
- 1 X User's manual
- 1 X Rawal Plug & Screw (Set)
- Coupling cable (2kva only)

Safety Clearance

The recommended tightening torque for terminals is 6kgf-cm.

The minimum clearance to the wall shall be larger than 30cm in order to ensure proper ventilation. In the event the ambient temperature is high, it's recommended to increase the distance of safety clearance to improve the heat dissipation.

Mounting Inverter on the wall

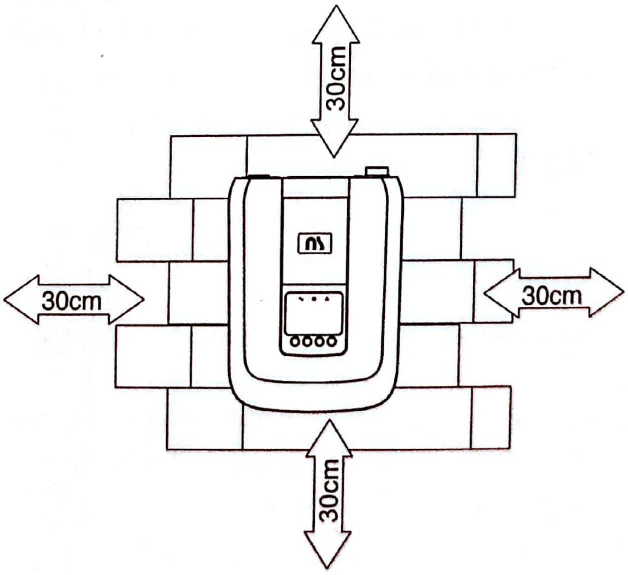
The inverter is designed to either be placed on horizontal surface or be mounted on the wall with various ways (as shown below). When mounting the inverter on the wall,

The wall shall be solid and strong enough to carry the inverter;

The location of installation shall allow the user to read the LCD easily;

Two screws shall be firstly fixed on the wall (distance as shown below) so that the inverter can be hung on the screws, recommended screw size is M4*50~65mm.

After mounting the inverter, make sure it's firmly mounted and won't easily fall off in the event of unexpected earthquake or vibration.



Batteries

Determine the size of battery

The inverter is designed with pre-set charging current and voltage. Given a fixed charging current, under-sized batteries may shorten the battery life while over-sized batteries may result in unreasonable recharging time.

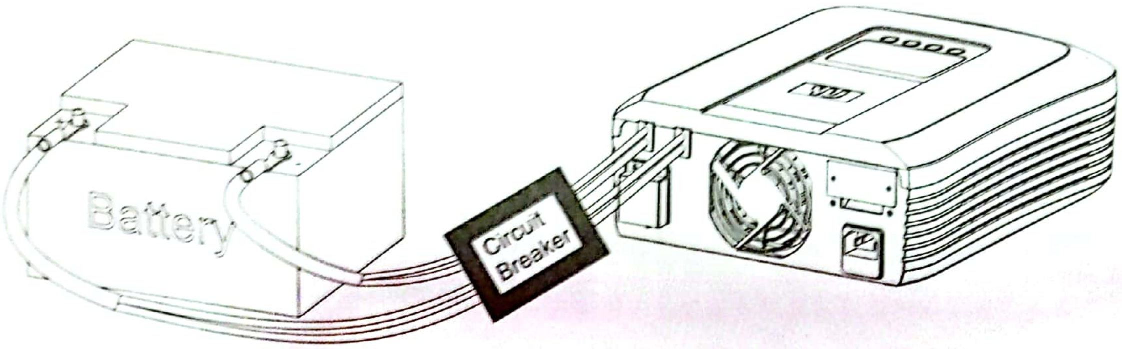
It's recommended the batteries capacity shall be no less than 100AH.

Connect the battery cables

The gauge of battery cables shall be no less than 6 AWG with 105℃ rating.

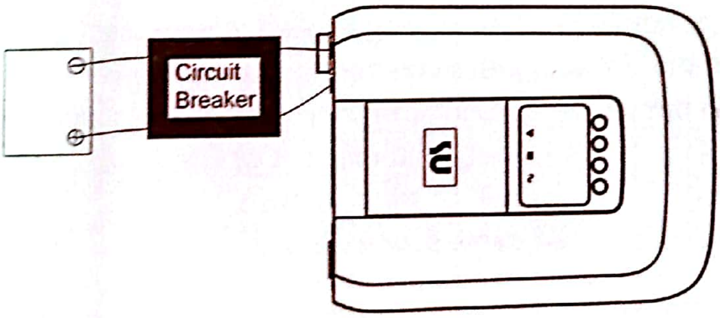
No matter how the batteries are connected (in series or in parallel), make sure the cables' terminal

voltage is consistent with the inverter's specification (12V for 1200VA model and 24V for 2000VA model).
It's recommended to cover the battery terminals during the connection.
Check the polarity the cables before connecting to the inverter.
Connect the Inverter DC cables with battery terminals as shown below



Connect with single battery

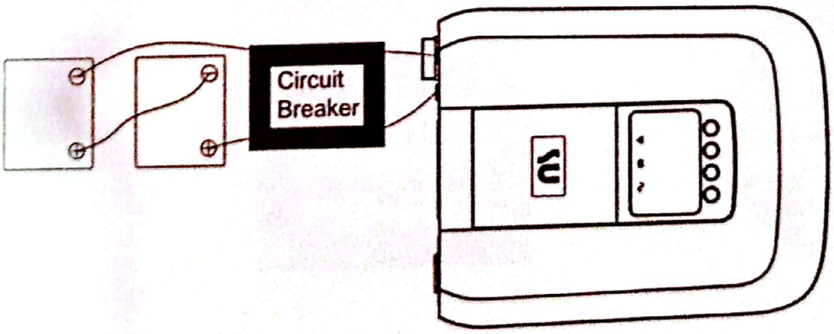
Make sure the battery voltage meets the inverter's specification (Only for 12V model)



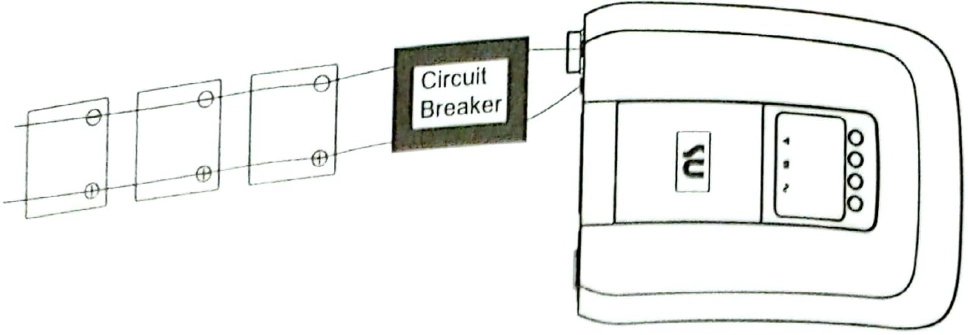
Connect with multiple batteries

⚠ While connecting multiple batteries, use the same brand/type for all batteries. Do not mix the battery bank with different brand/type of batteries.

The user may connect the batteries in series in order to double the voltage connected to inverter. The diagram below illustrate how to connect two 12V batteries in series to make up 24V (Only for 24V model)



The user may connect the batteries in parallel in order to increase the total battery capacity without changing the battery voltage. The example below shows parallel connection of multiple 12V batteries. While the total capacity is times by the number of battery, the terminal voltage remains 12V. (Only for 12V model)



PV (solar) string

Selection of PV Panel

PV string is a connection of PV panels whose output voltage and current vary under different illumination. And just like battery, the PV panel can be connected in either series or parallel as per needed. Please consult the supplier or PV panel so that the operational voltage and current fall within the allowed range of the inverter as set out in the specification.

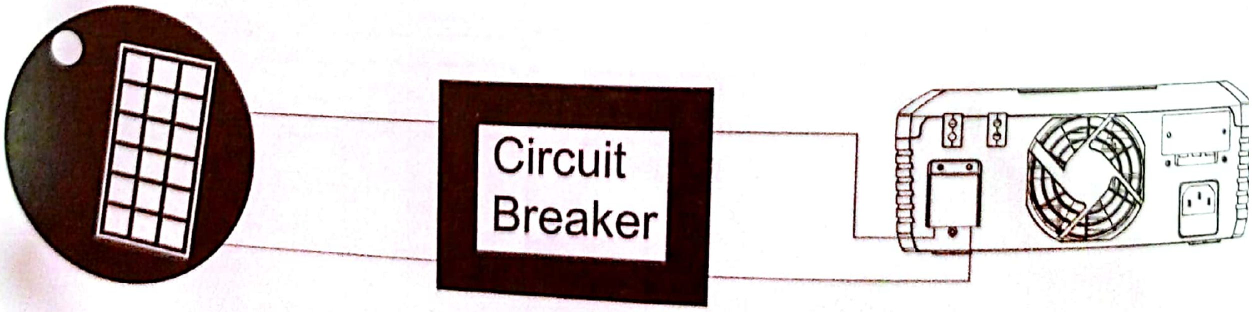
Please do not use PV panel which requires one terminal connected to ground (e.g. thin-film panel)

Connect the PV strings

As the PV string generates power as long as illumination exists, a circuit breaker shall be installed between the PV string and inverter so that the power from PV string can be switched off when needed (e.g. regular maintenance).The maximum value for PV Isc is 65A. It's very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Typical Amperage	Guage	Torque Value	Conductor cross-section(mm2)
65A	10AWG	1.4~1.6Nm	5.26

Connect the cables from PV string to PV input terminals as shown below. Please check the polarity before connection.

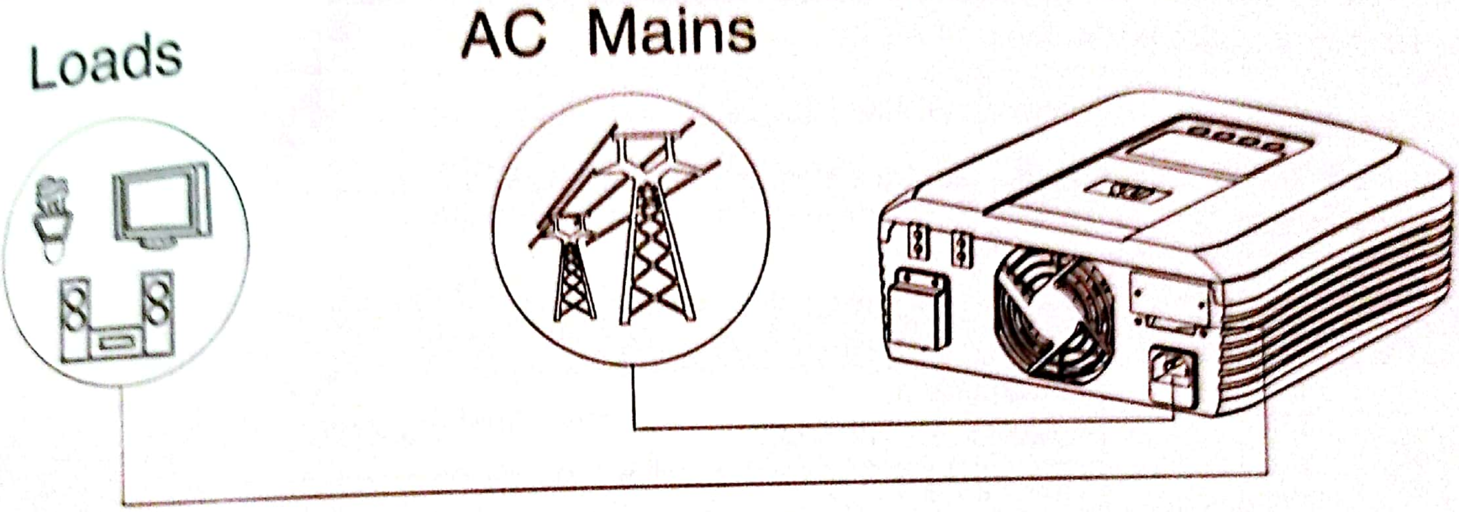


Connect to Utility and charge Connect AC input Cables and loads

Remove insulation sleeve 10mm for three conductors. And shorten phase L and neutral conductor N 3mm. Insert AC wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor (⏚/⏚) first, Connect the AC input cables and loads as shown below.

(⏚/⏚) → Ground (yellow-green)
L → Line (brown or black)
N → Neutral (blue)

Plug in the AC input power cord to the wall outlet. The unit will automatically charge the connected external battery even though the unit is off.



AC input voltage range selector

"NARROW"setting:
Configure LCD to "NARROW" when connected with loads which are more sensitive on voltage range. With this setting, the inverter is more sensitive to the voltage disturbance on the AC input and input voltage range is set at 170~280VAC while output voltage follows input voltage.

"WIDE"setting:
Configure LCD to "WIDE" when connected with loads which are less sensitive on voltage range (e.g. light bulb, fan, fluorescent tube, or TV). With this setting, the input voltage range is set at 90~280VAC while output voltage follows input voltage.

⚠ Please note that the inverter's transfer time switching from Line Mode to Backup Mode gets longer as the input voltage gets low. Under the circumstance, connecting the inverter with loads which are sensitive to transfer time (e.g. computer) might result in power interruption.

OPERATION

After connecting batteries, AC input cables, and loads, the inverter is now ready to work.

Power on/off

Once the inverter has been properly installed, press the power switch to turn on the unit. The unit will work automatically in line mode or inverter mode according to input utility power's status. When press the power switch again, the unit will be turned off.

LED Indicators

The operation mode of the inverter can be easily understood by LED indicators. Please see the table below for details.

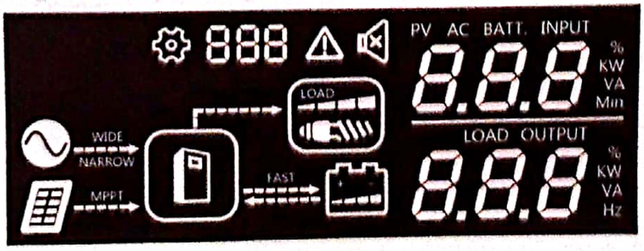
LED indicators			Information
● ∿	GREEN	Line mode 1 (charge current >3A)	Green flashing every 2 seconds
		Line mode 1 (charge current ≦3A)	Green solid lighting
		Off-charge mode	Green flashing as cycle: 0.5s On→0.5s Off→0.5s On→3.5s Off
● + -	YELLOW	Battery mode	Yellow solid lighting
● ⚠	RED	Overload	Red flashing every 0.5 second
		Fault	Red lighting

Function Keys

Function Keys	Description
⏻	To power on/off
🔧	To enter the setting mode or exit setting mode
▼/▲	To go to the next selection page
↵	To confirm the selection in setting mode

LCD Display

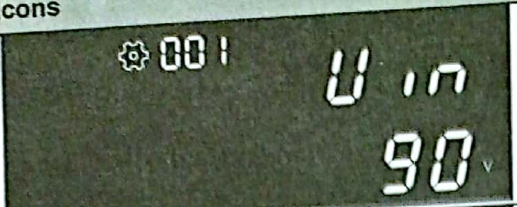
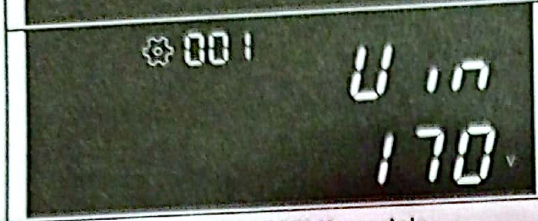
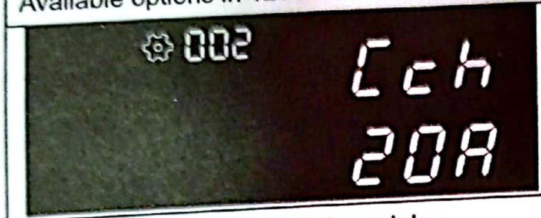
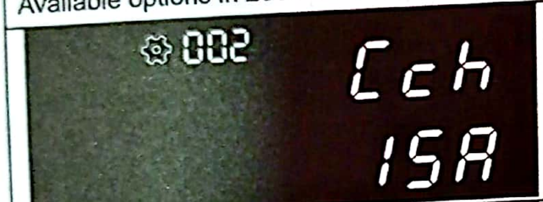
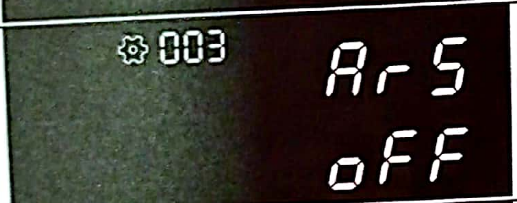
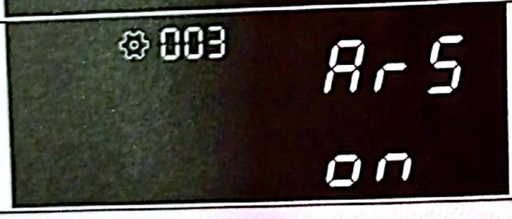
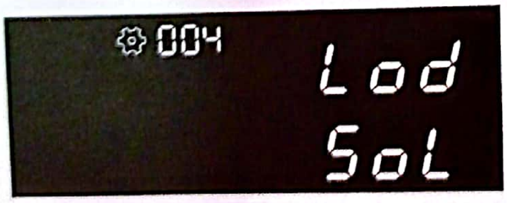
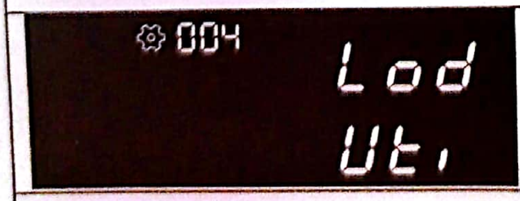
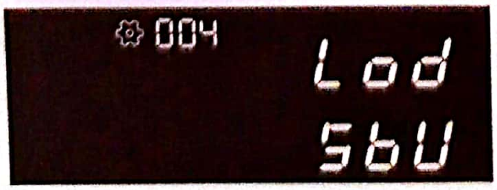
LCD displays the power flow and input/output readings in a visualized graphic design which allows the user to understand the operation status easily. The backlight of LCD remains on whenever the inverter is working (including Standby Charging Mode and Fault Mode).

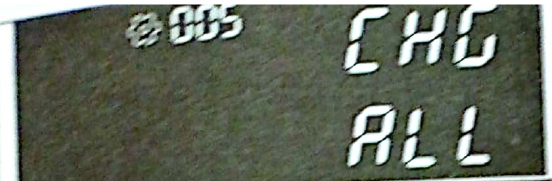
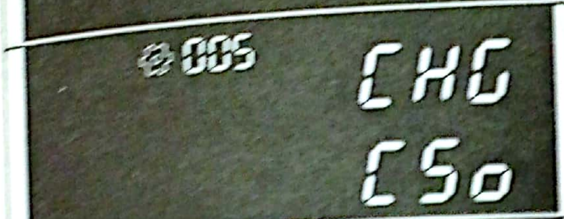
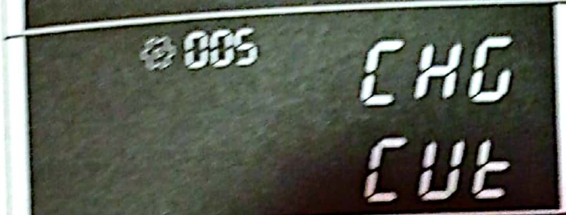
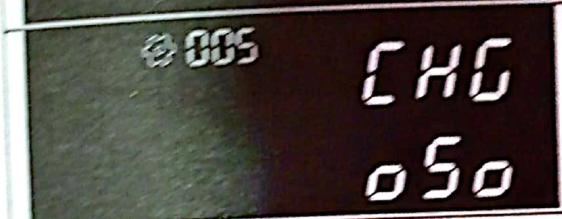
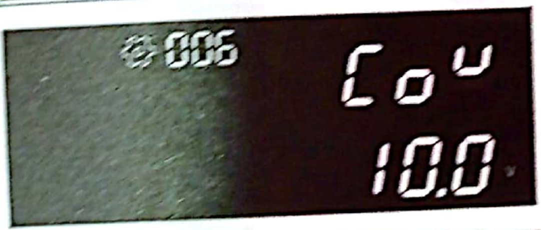
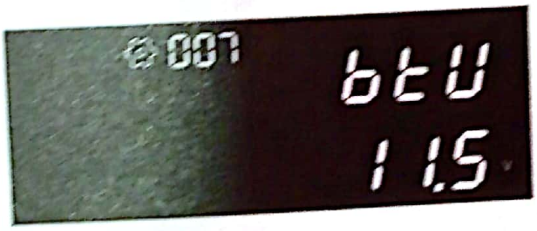
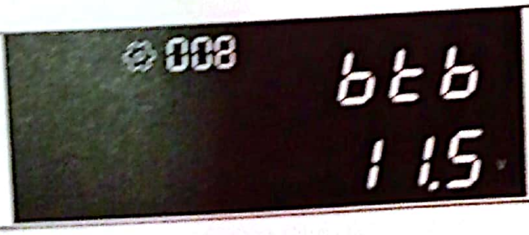
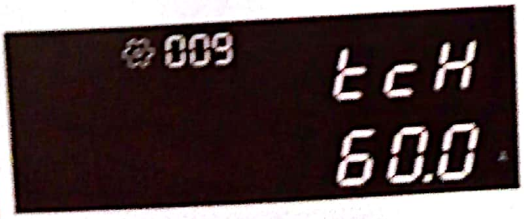


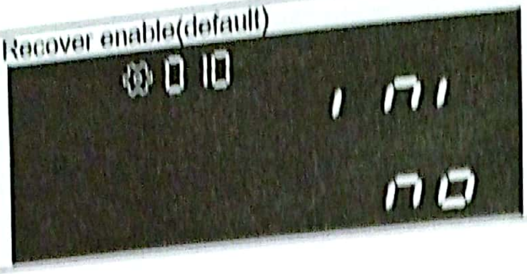
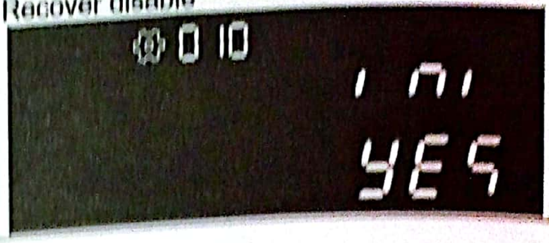
Icon	Function
Input source information	
AC	Indicates the AC input
PV	Indicates the PV input
8.8.8 V	Indicates input voltage
WIDE	Indicates the unit works in wide AC mode.
NARROW	Indicates the unit works in narrow AC mode.
Configuration Program and Fault Information	
⚙ 888	Indicates the setting programs
888 ⚠	Indicates the warning and fault codes
Output Information	
8.8.8	Indicates output voltage, load in Watt
Battery Information	
🔋	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status.
Load Information	
LOAD	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.
Mode operation information	
∿	Indicates the unit connects to the mains.
▦	Indicates the unit connects to PV panels.
Charging Information	
FAST	Indicates the AC charger current is setting to Maximum.

LCD Setting

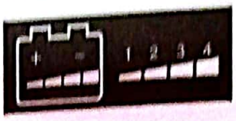
After pressing and hold 🔧 button for 3 seconds, the unit will enter setting mode. Press ▼/▲ button to select setting programs. And then, Press ↵ button to confirm the selection. If want exit the setting mode, press and hold the 🔧 button for 3seconds. The unit will exit setting mode if no operating for 30 seconds.

Setting Items	Icons	Description
AC input voltage range		If selected, acceptable AC input voltage will be within 90-280VAC(default)
		If selected, acceptable AC input voltage will be within 170-280VAC
Maximum AC charging current	Available options in 1200VA models	
		For 1200VA model, utility charging current is 20A , 25A is selectable.
	Available options in 2000VA models	
		For 2000VA model, utility charging current is 15A , 20A is selectable.
Auto restart when overload occurs		If selected, not auto restart when overload occurs in battery mode(default)
		If selected, auto restart when overload occurs in battery mode Note: reset 2 times every 30seconds, then inverter will go into fault mode if overload is not released.
Output source priority		Setting "PV priority" (default), if selectable, solar energy will provide power to loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will provide power to the loads at the same time. Utility provides power to the loads only when any one condition happens: -Solar energy is not available -Battery voltage drops to the low-level warning voltage or the setting point.
		Setting "utility priority", if selectable, utility will provide power to loads as first priority. Solar and battery energy will provide power to the loads only when utility power is not available.
		Setting "SBU priority", solar provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will provide power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point.

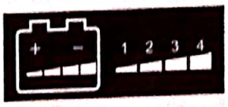
Charger source priority		If selected, the solar power and the utility power charging the battery together.(default)
		If selected, the solar power charging the battery first.
		If selected, the utility power charging the battery first.
		If selected, only solar power charging the battery no matter utility is available or not.
Battery shutdown voltage setting		Setting range is from 10.0V to 11.0V for 12V model and 20.0V to 22.0V for 24V model. Low cut-off voltage will be fixed to setting value no matter what percentage of load is connected. Available options in 12V model : 10.0V(Default)/10.2V/10.4V/10.6V/10.8V/11.0V Available options in 24V model : 20.0V(Default)/20.4V/20.8V/21.2V/21.6V/22.0V
Setting DC voltage point back to utility when selecting PV priority		Unit works in PV mode, if solar power is not sufficient to supply loads, the battery will power loads at the same time. When battery voltage drops to the setting voltage point, unit will transfer to utility mode. Available options in 12V model: 10.5/10.8/11.0V **(default)** /11.3V/11.5V/11.8V/12.0V/12.3V/12.5V/12.8V Available options in 24V model: 21.0v/21.5V/22.0V **(default)** /22.5V/23.0V/23.5V/24.0V/24.5V/25.0V/25.5V
Setting voltage point back to battery mode when selecting "SBU" or "Solar first" in program 4		Option in 1.2KVA models: FUL/12.5V/13V/13.5V(default)/14.0V Option in 2KVA models: FUL/25V/25.5V/26V/26.5/27V(default)/27.5V/28V
Max charging current: To configure total charging current for solar and utility chargers:(Max charging current=utility charging current + solar charging current)		Option in 1.2KVA models: 20A/30A/40A/50A/60A(default)/70A/90A Option in 2KVA models: 20A/30A/40A/50A/60A(default)/75A/85A

Recover manufactory setting	Recover enable(default)  	Recover disable 

Battery Charging Status 1.2KVA:

Status	Battery voltage	 			
		1	2	3	4
Floating	Bat=13.7V	Solid on	Solid on	Solid on	Solid on
CV	14.2>=Bat>=13.65V	Solid on	Solid on	Solid on	Flashing
CC	Bat>13.5V	Solid on	Solid on	Flashing	Flashing
	13.5>=Bat>13.0V	Solid on	Flashing	Flashing	Flashing
	Bat<=13.0V	Flashing	Flashing	Flashing	Flashing

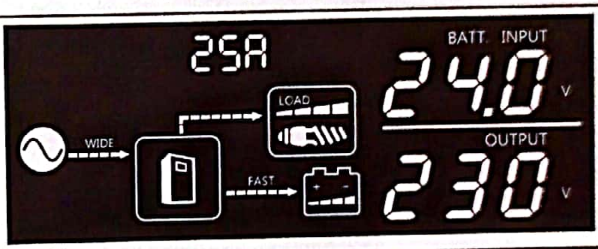
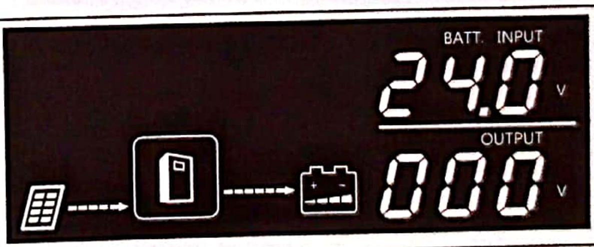
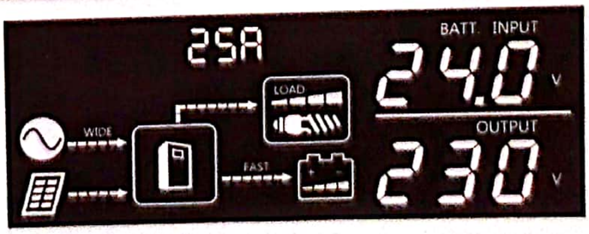
Battery Charging Status 2KVA:

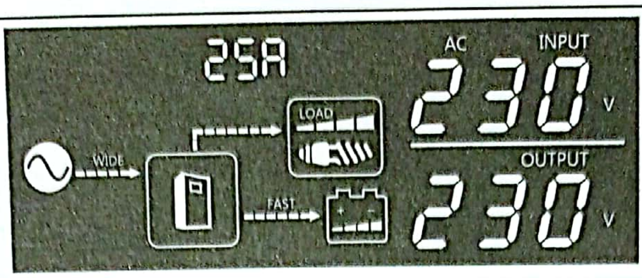
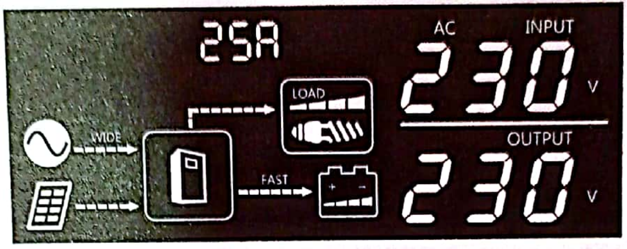
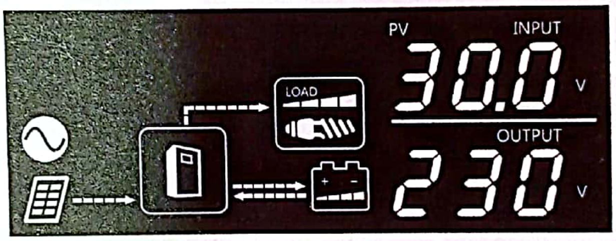
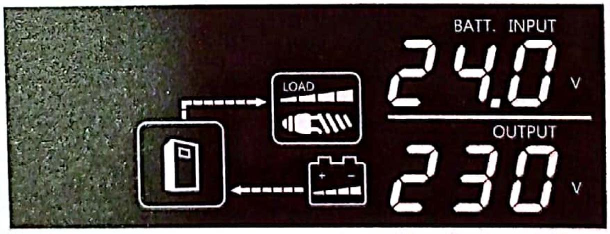
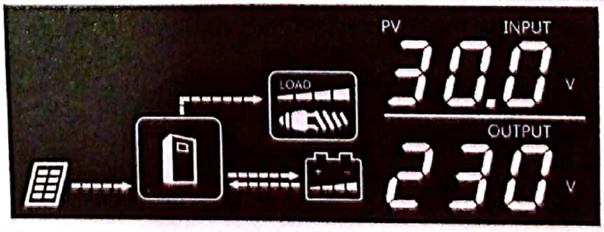
Status	Battery voltage	 			
		1	2	3	4
Floating	Bat=27.4V	Solid on	Solid on	Solid on	Solid on
CV	28.4V>=Bat>=27.3V	Solid on	Solid on	Solid on	Flashing
CC	Bat>27V	Solid on	Solid on	Flashing	Flashing
	27>=Bat>26V	Solid on	Flashing	Flashing	Flashing
	Bat<=26V	Flashing	Flashing	Flashing	Flashing

LCD Display Specification

Page Number	Upper Area Digital Display	Lower Area Digital Display
0	AC I/P Volt	O/P Volt
1	PV I/P Volt	O/P Volt
2	Battery Volt	O/P Volt
3	Battery Volt	O/P Freq
4	Battery Volt	Load O/P Percent
5	PV I/P Current	Load O/P Watt

Operating Mode Description

Operating mode	LCD Default Display
Standby Charging Mode	Utility input bypass to output, and battery can be charged without switching on the unit. The ∿ icon will flashing every 0.5s
	 25A BATT. INPUT 240 V LOAD WIDE FAST OUTPUT 230 V
	No Utility input, and battery can be charged only by PV without switching on the unit.
	
	Utility input bypass to output, and battery can be charged by PV or Utility without switching on the unit.The ∿ icon will flashing every 0.5s
	 25A BATT. INPUT 240 V LOAD WIDE FAST OUTPUT 230 V
Line Mode	Utility input bypass to output, and battery can be charged when switching on the unit.

<table>
<tr><td></td><td>
</td></tr>
<tr><td></td><td>Utility input bypass to output, and battery can be charged by PV or Utility when switching on the unit.</td></tr>
<tr><td></td><td>
</td></tr>
<tr><td></td><td>The backup power to load comes from both PV and battery if priority setting switch is set to give PV priority and PV power is also strong enough to support load.</td></tr>
<tr><td></td><td>
</td></tr>
<tr><td rowspan="4">Backup Mode</td><td>The backup power to load comes only from battery.</td></tr>
<tr><td>
</td></tr>
<tr><td>The backup power to load comes from both PV and battery.</td></tr>
<tr><td>
</td></tr>
</table>

Fault and warning code

Fault event or warning	Icon	Alarm
Battery Low	A56 ⚠	Buzzing every 2 seconds
Overload warning	A64 ⚠	Buzzing every 0.5 second
High temperature	A68 ⚠	Buzzing every 0.5 second
PV Voltage High	A88 ⚠	Buzzing every second
PV Current High	A89 ⚠	Buzzing every second
PV Charger NTC Disconnect	A91 ⚠	Buzzing every second
Output Volt high	E07 ⚠	Buzzing continuously
Output Short	E09 ⚠	Buzzing continuously
Over charge	E13 ⚠	Buzzing continuously
Overload Fault	E14 ⚠	Buzzing continuously
Fan Fail	E18 ⚠	Buzzing continuously
Over temperature	E19 ⚠	Buzzing continuously

TROUBLE SHOOTING

Problem	**Possible Cause**	**Remedial Action**
No LCD display	Battery voltage is low	Re-charge the battery and check if the battery cables are well-connected
	Battery is defective	Replace the batteries
	Power button is not pressed	Press and hold the power button
Mains are normal but works in backup mode	AC input is absent	Check the connection of AC input
Backup time is short	Overloading	Disconnect non-critical loads
	Battery voltage is too low	Re-charge battery for at least 8 hours
	Battery is bad	Replace good quality batteries
Alarm buzzer beeps continuously	Inverter entered into fault mode	Refer to the fault code to identify the fault and report to service representative for further assistance
Solar are normal but Solar charger doesn't work	PV reverse polarity protection	Re-connect the PV terminals
	Some parts wrong	Refer the fault and warning code

SPECIFICATION

Model	PREMIUM PLUS 1200	PREMIUM PLUS 2000
CAPACITY VA/W	1200VA/1000W	2000VA/1800W
AC INPUT		
Input Voltage Waveform	Follow the Utility	
Nominal Input Voltage	220-240V.a.c	
Input Voltage Range	Wide mode: 90-280V.a.c(default)/Narrow mode: 170-280V.a.c	
Maximun input current	10A.a.c	10A.a.c
Normal Input Frequency	50/60Hz(Auto detection)	
AC OUTPUT		
Output Voltage Waveform	Line Mode: Follow the Utility/Battery Mode: Modified sine-wave	
Nominal Output Voltage	220-240V.a.c	
Maximum output current	10A.a.c	10A.a.c
Frequency	50/60Hz(Auto detection)	
Efficiency	>80%(@Inverter mode with normal DC input,>60% R load) >96%(@Line mode with rated R load, battery full charged)	
Overload Protection	1min@ >110%,20s@>120%,0s@>150%	
Power Factor	0.838 (Inverter mode output power 1200VA/1000W)	0.9 (Inverter mode output power 2000VA/1800W)
Transfer Time(AC to DC)	15ms Typical, 40ms Max.	
BATTERY		
Battery Voltage	12±0.3V.d.c	24±0.6V.d.c
Maximum battery current	130A.d.c	93A.d.c
AC CHARGER		
Charging Algorithm	3-stage charging	
AC Charging Current	20A.d.c default, 0/10/15/25A.d.c (selectable)	15A.d.c default,0/5/10/20A .d.c (selectable)
Floating Charging Voltage	13.7V.d.c	27.4V.d.c
Over Charging Voltage	16V.d.c	32V.d.c
SOLAR CHARGER(MPPT)		
MAX. Solar Array Open Circuit Voltage	100V.d.c	
MPPT Range @ Operating Voltage	15-80V.d.c	30-80V.d.c
The Best Operating Voltage Range	15-18V.d.c	30-32V.d.c
System DC Voltage	12V.d.c	24V.d.c
MAX. Solar Charging Current	65A.d.c	
Maximum Isc PV	65A.d.c	
MAX. Solar Array Power	660W	1320W
Physical		
Total # of INVERTER Receptacles	IEC C13*1+Terminal*1	
Maximum Dimensions	309.5mm(W)* 244mm(H) *96mm(D)	
Weight	2.5kg	2.7kg
Warning Diagnostics		
Indicators	INVERTER Status Display	
Audible Alarms	Low Battery, Overload, Fault	
Management		
Auto-Charger	Yes	
Auto-Restart	Yes	
General Specification		
Protective Class	I	
Ingress Protection Rating	IP20	
Operating Temperature	0℃ to 55℃	
Operating Relative Humidity	5% to 95% non-condensing	

APPENDIX A How to Select and Configure PV Panels

The following parameters can be found in each PV panel's specification:

P max: Max output power (W)

V oc: open-circuit voltage (V)

I sc: short-circuit voltage (A)

V mp: Max power voltage (V)

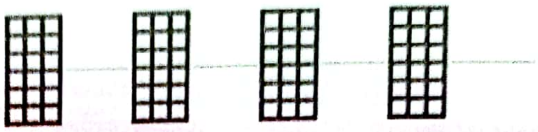
I mp: Max power current (A)

PV panels can be connected in series or parallel in order to obtain the desired output voltage and current which meets the inverter's allowed range.

When connecting PV panels in series, the max voltage and current of the string is

$V_{string}=V_1+V_2+V_3+V_4\ldots$

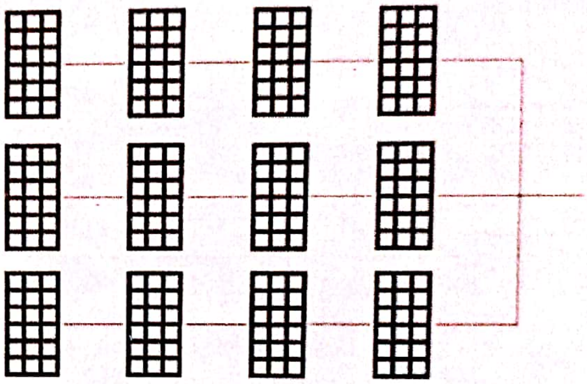
$I_{string}=I_1=I_2=I_3=I_4\ldots$



When connecting the above PV string in parallel, the max voltage and current of the total string is

$V_{total}=V_{string1}=V_{string2}=V_{string3}=V_{string4}\ldots$

$I_{total}=I_{string1}+I_{string2}+I_{string3}+I_{string4}\ldots$



In either case, the total output power is P total=P panel×Number of PV panel

The guideline to select and configure PV string is

P total shall be equal or slightly larger than the max. capacity of solar battery charger (660W for 1200VA model and 1320W for 2000VA model). Surplus capacity of PV string does not help the solar charger's capacity and only result in higher installation cost.

Total V mp of the string shall be within the best operating voltage range of solar battery charger (15~18V for 1200VA model and 30~32V for 2000VA model are recommended).

Total Imp of the string shall be less than the max. charging current of the solar battery charger (65A for 1200VA and 2000VA model)

Total Voc of the string shall be less than the max. input voltage of the solar battery charger (100V for 1200VA and 2000VA model)

Total ISC of the string shall be less than the max. input current of the solar battery charger (65A for 1200VA and 2000VA model)

Example 1 – How to connect 1200VA model to PV panels with the following parameters?

P_{max}: 150W **V_{mp}: 18V**

V_{oc}: 21.6V **I_{mp}: 8.2A**

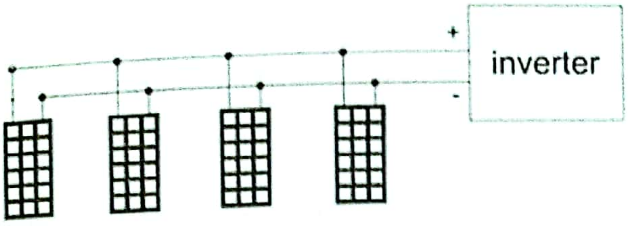
I_{sc}: 8.75A

(1) The max. PV input power for 1200VA model is 660W,
660W/150W=4.5=>Max. 4 PV panels shall be connected

(2) The best operating Voltage range is 15~18V,
18V/18V=1=>Max. Number of PV panel in series is 1.

(3) Max. charging current is 65A,
65A/8.2A=7.9=>Max. Number of PV panel in parallel is 7

(4) Taking (1)~(3) into consideration, the optimized configuration is 4 PV panels in parallels(as shown below)



(5) Check again the Voc and Imp of PV string,
Voc of string is 21.6V<100V (Max. PV input Voltage)=>OK
I mp of string is 4×8.2A=32.8A<65A (Max. PV Input Current)=>OK

Example 2 – How to connect 2000VA model to PV panels with the following parameters?

P max: 150W **V mp: 18V**
V oc: 21.6V **I mp: 8.2A**
I sc: 8.75A

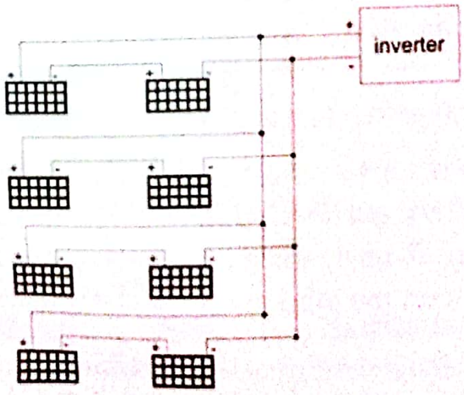
P max: 250W **V mp: 18V**
V oc: 21.6V **I mp: 13.8A**
I sc: 14.58A

(1) The max. PV input power for 2000VA model is 1320W,
1320W/150W=8.8=>Max. 8 PV panels shall be connected for 150W panel.
1320W/250W=5.28=>Max. 5 PV panels shall be connected for 250W panel.

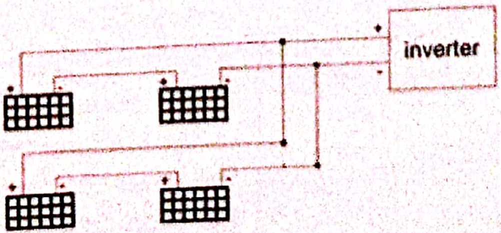
(2) The best operating Voltage range is 30~32V,
32V/18V=2=>Max. Number of PV panel in series is 2 for 150W&250W panel.

(3) Max. charging current is 65A,
65A/8.2A=7.9=>Max. Number of PV panel in parallel is 7 for 150W panel.
65A/13.8A=4.7=>Max. Number of PV panel in parallel is 4 for 250W panel.

(4) Taking (1)~(3) into consideration, the optimized configuration is 2 PV panels in series as a string, and 4 PV panels in parallels (as shown below)



Taking (1)~(3) into consideration, the optimized configuration is 2 PV panels in series as a string, and 2 PV panels in parallels for 250W panel(as shown below)



(5) Check again the Voc and Imp of PV string,
Voc of string is 2×21.6V=43.2<100V (Max. PV input Voltage)=>OK(for 150W&250W panel)
I mp of string is 4×8.2A=32.8A<65A (Max. PV Input Current)=>OK (only for 150W panel)
I mp of string is 2×13.8A=27.6A<65A (Max. PV Input Current)=>OK (only for 250W panel)

APPENDIX B How to determine setting and charger source priority setting?

Please read this document carefully if you intend to manually set the priority setting of the product. Improper setting might compromise the function and performance of the product.

This product is designed to accept both utility and solar power as input source, and it also provides a function allowing the user to determine the priority between utility and solar input power. The priority is to be set via LCD and control buttons on the front panel (please refer to user manual for more details). This document explains how the product's behavior will be at each setting and what should be considered while determine the priority.

A. Output source priority setting

1. Setting Utility as output source priority(UTI)

1.1 When utility is normal

The loads connected to the product are supplied by utility power only, even when solar power presents.

1.2 When utility is down

As soon as the utility is down, the inverter enters into "Backup Mode" and checks both solar power and battery's status. If solar power is strong enough, it will supply the loads. If solar power becomes weak, the loads will then be supplied by battery until it's too low. The longer the solar power lasts, the less the consumption from the battery and hence the longer backup time.

Advantages	Disadvantages/Risk
Battery chance to keep the battery fully-charged so that the backup function won't be compromised when the utility is down. Good for battery life as batteries are less chance to work on discharging mode.	The solar power cannot be fully utilized by supporting the loads, especially when battery is fully charged.

2. Setting Solar as output source priority(SOL)

2.1 When utility is normal

As long as solar power is strong enough to support the loads, utility power will not be consumed even though it's available. If solar power is not enough, battery will firstly come up to support the loads, and after battery is low or the setting point in program 8, utility will then take over to support the loads. If solar is absent, utility will then take over to support the load too.

2.2 When utility is down

The behavior is the same as 1.2.

Advantages	Disadvantages
The good utilization of solar power. Save electricity bill by reducing the consumption of utility.	Battery will experience more frequent charge and discharge cycles and therefore service life of battery will be shorter. If both solar power and battery is low, and utility outage occurs before the battery can fully-charged by utility, the backup function of the product might be compromised or void.

3. Setting Solar as output source priority(SBU)

3.1 When utility is normal

As long as solar power is strong enough to support the loads, utility power will not be consum
even though it's available. If solar power is not enough, battery will firstly come up to support t
loads, and after battery is low or the setting point in program 8, utility will then take over to sup

the loads and charge the battery.

3.2 When utility is down

The behavior is the same as 1.2.

Advantages	Disadvantages
The utilization of solar power is maximized. Save electricity bill by reducing the consumption of utility.	Battery will experience more frequent charge and discharge cycles and therefore service life of battery will be shorter. If both solar power and battery is low, and utility outage occurs before the battery can fully-charged by utility, the backup function of the product might be compromised or void.

Summay

Whether setting utility as priority or setting solar or SBU as priority is subject to purpose of installing the product. In the event the product is to be installed in areas where the utility power is unstable and backup is much important than energy saving, utility shall be set as priority.

If the product is to be installed in areas with stable utility power and strong sunlight, and energy saving is more concerned than backup function, solar power shall be set as priority or SBU.

B. Charger source priority setting

1. Setting Utility as charger source priority

Utility first: Utility will charge battery as first priority.

Solar energy will charge battery only when utility power is not available.

2. Setting Solar as charger source priority

Solar energy will charge battery as first priority.

Utility will charge battery only when solar energy is not available.

3. Setting only Solar as charger source priority

Solar energy will be the only charger source no matter utility is available or not.

4. Setting both Solar and Utility as charger source priority

4.1 When utility is normal

Solar energy and utility will charge battery at the same time.

4.2 When utility is down

Solar energy will charge battery.

Summary

Whether setting which option as charger source priority subject to purpose of installing the product. In the event the product is to be installed in areas where the utility power is unstable and backup function is much important than energy saving, Solar and Utility or Utility shall be set as charger source priority.

If the product is to be installed in areas with stable utility power and strong sunlight, and energy saving is more concerned than backup function, solar first or only solar shall be set as priority, and set the maximum utility charging current as small current as possible(in program 2), for example: 5A.

APPENDIX C Information related to maintenance

Maintenance instructions shall include the following:

- Intervals and instructions for any preventive maintenance that is required to maintain safety (for example air filter replacement or periodic re-tightening of terminals);
- instructions for accessing operator access areas, if any are present, including a warning not to enter other areas of the equipment;
- part numbers and instructions for obtaining any required operator replaceable parts;
- instructions for safe cleaning (if recommended);
- where there is more than one source of supply energizing the PCE, information shall be provided in the manual to indicate which disconnect device or devices are required to be operated in order to completely isolate the equipment.

Compliance is shown by inspection.

Battery maintenance

Where required by 14.8.5, the documentation shall include the applicable items from the following list of instructions regarding maintenance of batteries;

NOTE. The exact wording below does not have to be used as long as the intended information is provided.

- Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions.
- When replacing batteries, replace with the same type and number of batteries or battery packs.
- General instructions regarding removal and installation of batteries.
- CAUTION: Do not dispose of batteries in a fire. The batteries may explode.
- CAUTION: Do not open or damage batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
- CAUTION: A battery can present a risk of electrical shock and high short-circuit current.

The following precautions should be observed when working on batteries:

a) Remove watches, rings, or other metal objects.
b) Use tools with insulated handles.
c) Wear rubber gloves and boots.
d) Do not lay tools or metal parts on top of batteries.
e) Disconnect charging source prior to connecting or disconnecting battery terminals.
f) Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

Compliance is checked by inspection.

DIPOSAL

In the event the product reaches the end of its service life, please contact the local dealer for disposal instructions.

The product must not be disposed of with the household waste.

Disposal of the product at the end of its service life shall be done in accordance with applicable regulations for electronic waste.